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### Introduction

A wide range of habitats or microhabitats characterizes the Mediterranean ecosystems. They are important not only for their biodiversity but also for their crucial role in coastal protection. The retreat of the coastline, largely caused by massive removal of sediments and the destruction of coastal dune ridges resulting from continuous beach and backshore development, constitutes a real threat to coastal habitats. The destruction of coastal habitats is further worsened by overcrowded places and leads to the loss of vegetation, often with high heritage value that is urgent to preserve.

This project aims to strengthen capacities by providing training to garden staff and students completing their master's degree, with the objective of enhancing knowledge about coastal flora and ex situ and in situ conservation techniques. This teamwork involves the constitution of a seed bank and a reference herbarium of taxa encountered along the sandy coastlines on both shores of the Mediterranean. The preservation of plant species with heritage value, through the creation of seed banks on either side of the Mediterranean, supported by capacity building in the field of conservation and restoration, is a key factor in ensuring the protection and sustainable management of these vulnerable coastal ecosystems. Conservation actions for species dependent on these very exposed sandy coastal environments have been launched through a regional action plan for *Stachys maritima*, stationary assessments for other species, and the implementation of studies prior to the restoration of coastal plant species.

### Objectives

- Carrying out actions on both territories of the Mediterranean sea;
- Improved knowledge of certain rare and threatened taxa;
- Preliminary studies for the restoration of species (seed harvesting and germination tests);
- Training, awareness;
- Exchanges of expertise on both shores of the Mediterranean sea;
- Technical support and assistance for the ecological restoration of coastal habitats.

### Study sites

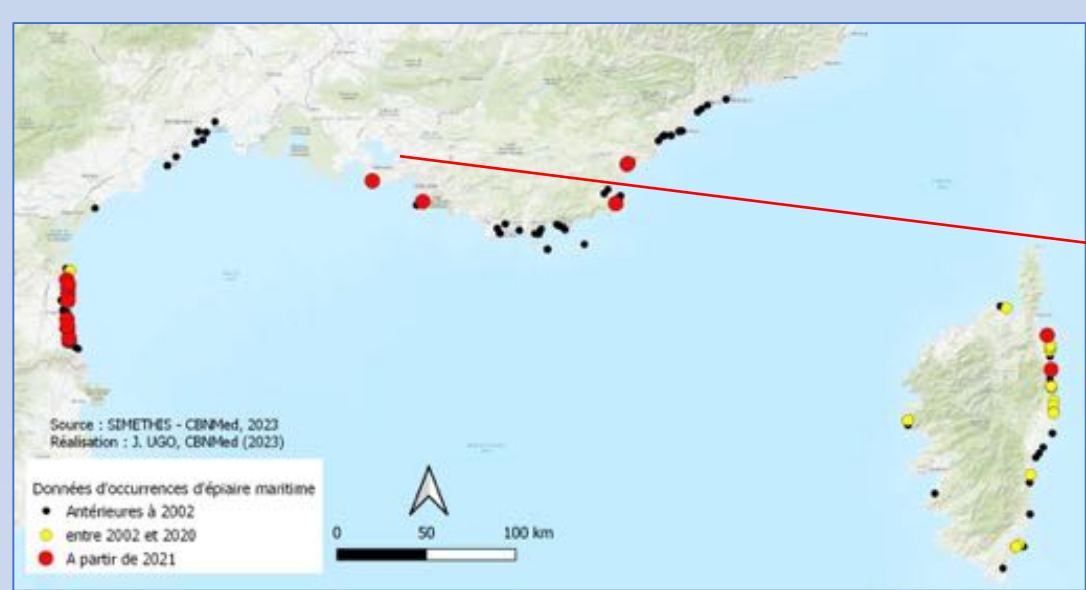
- Three sites on the Algerian coast (Kheloufi, Zeralda) and Beni Belaid for *Echinophora spinosa* ;
- One site in Camargue (France) for *Maresia nana* (Les Quatre Maries) ;
- Four remaining stations of *Stachys maritima* in region PACA + wide coastal strip around Perpignan (region Occitanie).



### Actions carried out

#### 1 - A regional action plan for *Stachys maritima*

*Stachys maritima* Gouan is one of the most endangered species of the mediterranean basin. This extremely rare plant dependent on sandy coastlines has lost more than 90% of its area of occurrence in Spain, and nearly 75% in France ("CR" in the regional red list - Noble et al., 2015), disappeared from the Algerian coasts. Figuring among the priority taxa of the network of actors for the conservation of Mediterranean flora (RESEDA-Flore), this species was first the subject of a stationary assessment on its stations on the French continental coast (PACA and Occitanie regions). ) in 2021 and 2022. This work led to the development of a regional action plan focused on the PACA region where the species is most in danger of extinction. This work mobilized a wide range of partners: state services, local authorities, natural area managers, research laboratories, educational establishments, etc. After more than a year of consultation with local partners, around fifteen actions divided into three main objectives were proposed. The plan was presented at the end of September 2023 to the steering committee meeting in the town of Ramatuelle, the last regional stronghold of the species.



#### 2-Improved knowledge of coastal taxa

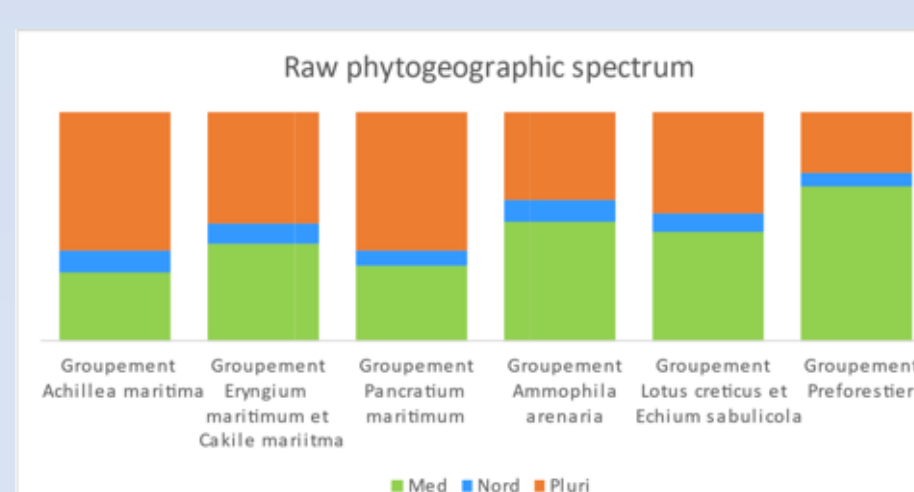
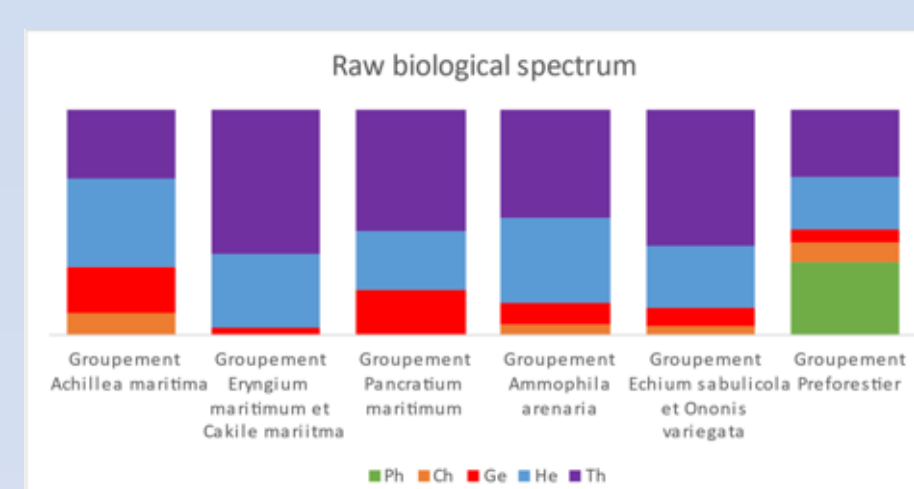
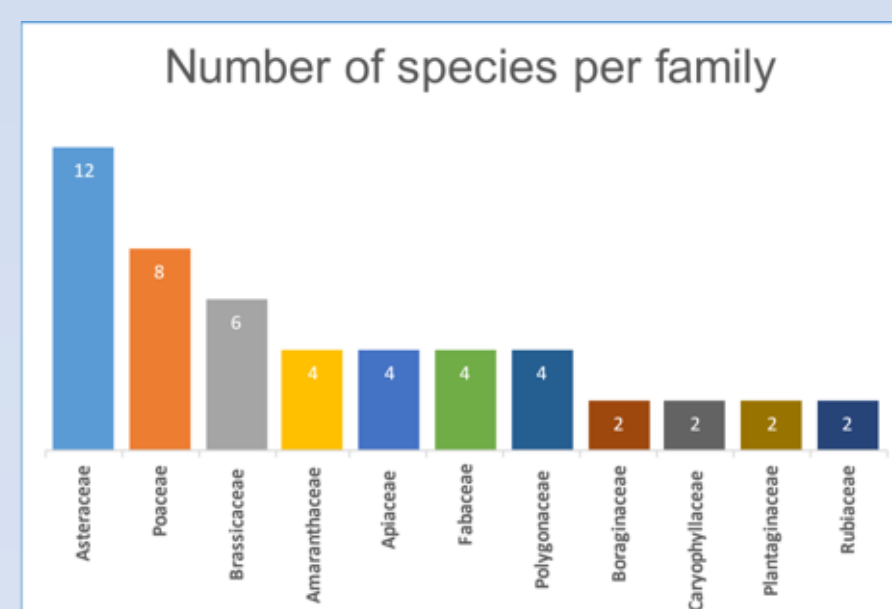
Several missions were carried out jointly by the staff of the Hamma JEH garden and their scientific partners from University Houari Boumediene to establish statistical reports on key species of the Algerian coast exposed to numerous threats (*Echinophora spinosa*, *Pancreatium maritimum*, *Ammophila arenaria*, *Achillea maritima*). On the other side of the Mediterranean basin, the staff of the National Mediterranean Botanical Conservatory of Porquerolles (France) carried out field studies on coastal plant species. Stationary assessments have been conducted on *Cyperus capitatus*, *Maresia nana* and *Erodium laciniatum*. This part of the project aims to draw up an initial assessment of the situation of each threatened species in both sides, as well as an initial diagnostic assessment of the state of conservation of its stations. The final objective is to initiate active partnerships. and implement conservation actions to preserve, maintain and restore these species and their habitat in a highly anthropized context.



*Ammophila arenaria* & *Pancreatium maritimum* (Zemmouri, Algeria)



*Echinophora spinosa* & *Achillea maritima* (Jijel, Algeria)



Collected data for systematic, biological and phylogeographic characterization of emblematic coastal species.

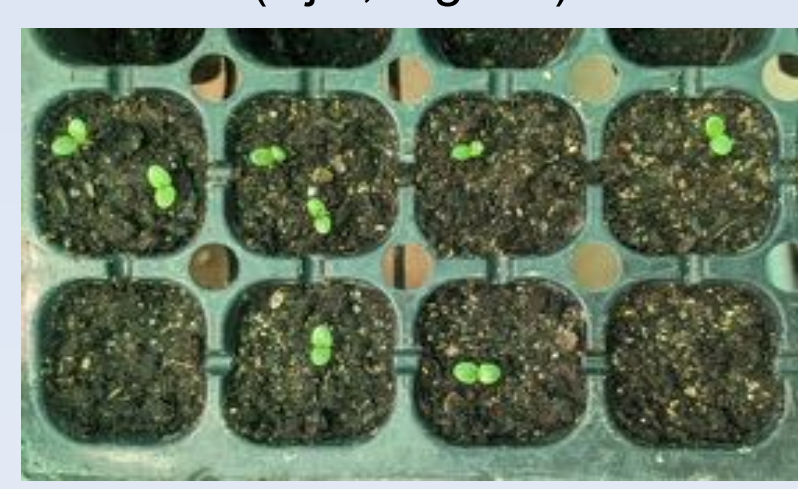


*Erodium laciniatum* Plage de Pampelonne (Ramatuelle, Var) Monitoring of *Stachys maritima* and *Maresia nana*



#### 3-Preliminary studies for restoration (seed harvesting and germination tests)

Germination tests have been conducted on *Ononis variegata* and will be enlarged for *Echinophora spinosa*.



#### 4- Communication - Valorisation of the project

- Scientific meeting and restitution work in Algiers on September 10 and 11, 2023 at the (Sofitel Hamma Garden and on coastal sites in Algiers)
- Scientific meeting at Hyeres ( Porquerolles, Ramatuelle)
- Establishment of a seed collection guide for technical staff of the botanical garden and other users, elaboration of local coastal flora field book . Ongoing action.



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